Yuan "Charles" Cui

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digital-flaneur.github.io

Research Interests

Broad Interests—human–AI collaboration, data visualization, data science, AI for education and health.
Ph.D. Thesis—designing/developing/evaluating adaptive, scalable, and human-centered technology for data visualization and education (using large language models, data science, and qualitative methods).
Other Interests—building data science solutions for non-profits and governments to address social problems.

Education

Northwestern University — Evanston, IL
Ph.D., Computer Science — 2020 - Present
Advisor: Matthew Kay
Master's, Computer Science — 2020 - 2023
Advisor: Matthew Kay

Oberlin College — Oberlin, OH
B.A., Mathematics, Computer Science — 2016 - 2020

Budapest Semesters in Mathematics — Budapest, Hungary
Study Abroad — 2019

Publications

AVEC: An Assessment of Visual Encoding Ability in Visualization Construction
Lily W. Ge, Yuan Cui, Matthew Kay
ACM Conference on Human Factors in Computing Systems (CHI) 2025 | Acceptance Rate: 25%

Promises and Pitfalls: Using Large Language Models to Generate Visualization Items
Yuan Cui, Lily W. Ge, Yiren Ding, Lane Harrison, Fumeng Yang, Matthew Kay
IEEE Visualization Conference (VIS) 2024 | Acceptance Rate: 22%

Odds and Insights: Decision Quality in Exploratory Data Analysis Under Uncertainty
Abhraneel Sarma, Xiaoying Pu, Yuan Cui, Eli T Brown, Michael Correll, Matthew Kay
ACM Conference on Human Factors in Computing Systems (CHI) 2024 | Best Paper Honorable Mention (Top 5%)

Adaptive Assessment of Visualization Literacy
Yuan Cui, Lily W. Ge, Yiren Ding, Fumeng Yang, Lane Harrison, Matthew Kay
IEEE Visualization Conference (VIS) 2023 | Acceptance Rate: 25%

CALVI: Critical Thinking Assessment for Literacy in Visualizations
Lily W. Ge, Yuan Cui, Matthew Kay
ACM Conference on Human Factors in Computing Systems (CHI) 2023 | Best Paper Honorable Mention (Top 5%)

Can an Algorithm be My Healthcare Proxy?
Duncan McElfresh, Samuel Dooley, Yuan Cui, Kendra Griesman, Weiqin Wang, Tyler Will, Neil Sehgal, and John Dickerson
Explainable AI in Healthcare and Medicine 2021

Manuscripts

How High School Teachers Develop Tests and How AI Could Help
Yuan Cui, Mia Cheng, Matthew Kay, Fumeng Yang. (*Under Review*)

Quantifying the Uncertainty of Age-Specific Mortality Estimates in Data-Scarce Contexts
Nathaniel Darling, Yuan Cui, Irena Chen, Ugofilippo Basellini, Monica Alexander.
Population Association of America Annual Meeting Poster Presentation (PAA) 2025

Professional Experience

University of Maryland | FIGX Lab College Park, MD
Visiting Ph.D. Researcher 12/2024 - 06/2025
Developing interactive AI-powered systems for educational test development.

Max Planck Institute for Demographic Research Rostock, Germany
Social Data Science Researcher 06/2024 - 08/2024
Built statistical models to estimate age-specific mortality in a data-scarce context. Coauthored a paper, which was accepted to Population Association of America 2025 Annual Meeting.

Stanford University | Regulation, Evaluation, and Governance Lab (REGLAB) Stanford, CA
Graduate Fellow 06/2023 - 08/2023
Designed statistical sampling techniques to estimate racial disparity when data is scarce, and established performance guarantees with mathematical proofs. Built simulations and estimated health disparity in a dataset containing ~7M Americans' healthcare records.

Carnegie Mellon University | Data Science for Social Good Foundation (DSSG) Pittsburgh, PA
Data Science Fellow 05/2022 - 08/2022
Built a machine learning system to improve call routing of the 988 Lifeline which serves ~2M callers per year. Obtained results that suggested the new system could help ~20K additional callers per year.

University of Chicago | Consortium on School Research Hyde Park, IL
Research Intern 03/2022 - 05/2022
Built statistical models on Chicago Public Schools data to predict students' graduation rates.

HomeRiser, Inc Remote
Co-founder, Head of Data Science 01/2021 - 10/2021
Co-founded a real estate technology start-up to provide more flexible and affordable ways to finance people's home ownership. Developed a financial model in Python that simulated cash flow and generated a detailed profit and loss statement.

University of Maryland | REU - Combinatorics and Algorithms for Real Problems College Park, MD
Undergraduate Researcher 05/2019 - 08/2019
Developed a machine learning model for advance healthcare directives. Deployed active learning algorithms to dynamically select survey questions based on patients' previous responses. Built a website to collect data. Coauthored a paper, which was accepted to the *Explainable AI in Healthcare and Medicine*.

Oberlin College | Computer Science Department Oberlin, OH
Undergraduate Researcher 06/2018 - 08/2018
Analyzed a repeated pricing game between a buyer and a seller in the presence of privacy and the absence of commitment power. Conducted numerical experiments and solved for equilibrium in the game. Formalized results about the effect of privacy in our repeated sales setting.

Presentations, Tutorials, Workshops

Presentations

IEEE Visualization Conference (VIS). *"Promises and Pitfalls: Using Large Language Models to Generate Visualization Items."* Oct 2024, Tampa, FL.

Max Planck Institute for Demographic Research (MPIDR). *"A Fast and Furious Introduction to Computer Science."* Jul 2024, Rostock, Germany.

IEEE Visualization Conference (VIS). *"Adaptive Assessment of Visualization Literacy."* Oct 2023, Melbourne, Australia.

Data for Good Conference. *"Improving the 988 Suicide & Crisis Lifeline's Service Through Better Call Routing."* Sept 2022, Seattle, WA. Joint with Irene Tang.

Tutorials

Max Planck Institute for Demographic Research (MPIDR). *"Building an Academic Website and Hosting on Github."* Jul 2024, Rostock, Germany.

ACM Conference on Fairness, Accountability, and Transparency (FACCT). *"Data Externalities."* Mar 2021, Remote. Joint with Rediet Abebe, Mihaela Curmei, Andreas Haupt, and Yixin Wang.

Workshops

ACM Conference on Human Factors in Computing Systems (CHI). *"Toward a More Comprehensive Understanding of Visualization Literacy."* May 2024, Honolulu, HI. Joint with Lily W. Ge, Maryam Hedayati, Yiren Ding, Karen Bonilla, Alark Joshi, Alvitta Ottley, Benjamin Bach, Bum Chul Kwon, David N. Rapp, Evan Peck, Lace M. Padilla, Michael Correll, Michelle A. Borkin, Lane Harrison, Matthew Kay.

Honors and Awards

Intersection Science Fellowship (Northwestern Institute on Complex Systems)	2024
Best Paper Honorable Mention for "Odds and Insights…" (CHI)	2024
Best Paper Honorable Mention for "CALVI…" (CHI)	2023
HCI + Design Cluster Fellowship (Northwestern University)	2022
Phi Beta Kappa (Oberlin College)	2020
Elbridge P. Vance Scholar of Mathematics (Oberlin College)	2016 - 2020

Professional Service

Equity and Access in Algorithms, Mechanisms, and Optimization Bridges (EAAMO Bridges)

Co-Director	2022 - present
Co-Lead of the Data Economies Working Group	2021
Membership Manager	2021

Northwestern University

Computer Science Ph.D. Advisory Council	2025 - present

The Journal of Visualization and Interaction (JOVI)
Open Practices Chair 2024 - present
Reviewer 2024 - present

Conference Reviewer
International Conference on Artificial Intelligence in Education (AIED) 2025
IEEE Visualization Conference (VIS) 2024
ACM Conference on Human Factors in Computing Systems (CHI) 2024

Conference Volunteer
ACM Symposium on Theory of Computing (STOC) 2021
ACM Conference on Economics and Computation (EC) 2020

Selected Media

Making Meaningful Impact: Using Data Science for Social Good 2022
Carnegie Mellon University Heinz College
Applying Technical Knowledge for Social Good 2022
Northwestern University Computer Science
Nine International Obies Will Begin PhDs in STEM 2020
Oberlin College and Conservatory
Oberlin Shansi Announces Summer 2019 In-Asia Grant Recipients 2019
Oberlin College and Conservatory
Building Solidarity with Youth in Nepal 2017
Oberlin College and Conservatory

Teaching Experience

Northwestern University Evanston, IL
Computer Science Department 2021-2024
TA: *Design & Analysis of Algorithms, Mathematical Foundations of Computer Science (2x)*

Oberlin College Oberlin, OH
Mathematics Department 2017-2020
TA: *Linear Algebra (2x), Discrete Mathematics (2x), Calculus II, Calculus I*
Economics Department 2019
TA: *Principles of Finance*
Computer Science Department 2017
TA: *Introduction to Computer Science*

Mentoring (Research and Projects)

Current Students
Jovy Zhou (Northwestern UG)
Xiaolin Liu (Northwestern UG)

Eric Lee (Northwestern UG)
April Shi (Northwestern UG)
Joshua Yao (Northwestern UG)
Laura Félix (Northwestern UG)
Annabel Goldman (Northwestern UG)
Irena Liu (Northwestern UG)
Christopher Heo (Northwestern UG)
Clarissa Shieh (Northwestern UG)
Rachel Johnson (Northwestern UG)

Past Students

Mia Cheng (Northwestern UG → Datadogs)
Natalie Cheng (Northwestern UG)
Harry Guan (Northwestern UG)
Thushan Ranasinghe (University of Maryland UG)
Frank Yang (Northwestern UG → Scale AI)
Kevin Su (Northwestern UG → Palantir Technologies)
Zarif Ceaser (Northwestern UG → Northwestern Mutual)
Karthik Subramanian (Northwestern UG → Amazon Web Services)
Ryan Wong (Northwestern UG → Citadel)
Josh Lee (Northwestern UG → JPMorganChase)

Technical Skills

Programming Languages
Python, R, TypeScript, JavaScript, PostgreSQL, Mathematica, LaTeX

Frameworks
Flask, Next.js, React

Organization
Github, Notion, Trello

Research Software and Skills
Qualtrics, Prolific

References

Matthew Kay | Assoc. Prof. of Computer Science and Communication Studies
Institution: Northwestern University Contact: mjskay@northwestern.edu

Fumeng Yang | Asst. Prof. of Computer Science
Institution: University of Maryland, College Park Contact: fmy@umd.edu

Lane Harrison | Assoc. Prof. of Computer Science
Institution: Worcester Polytechnic Institute Contact: ltharrison@wpi.edu

Rayid Ghani | Distinguished Career Prof. of Machine Learning and Public Policy
Institution: Carnegie Mellon University Contact: rayid@cmu.edu